AMENDMENTS TO THE CLAIMS

1. (currently amended) An image ~~A color~~ correction method comprising:

obtaining reference outputs from an image sensor using a color image array, said reference outputs being indicative of outputs for a plurality of known reference colors, said plurality of known reference colors including white ~~gray scale elements~~, at least three primary colors, and at least two other non-primary colors;

determining an error measure for each of said plurality of known reference colors, said error measure representing a difference between said reference outputs and what would be expected for each of said reference outputs;

obtaining a single color correction matrix which is adjusted to minimize simultaneously each said respective error measure to obtain optimum overall correction for ~~each of~~ said plurality of known reference colors, including white; and

applying ~~using~~ said color correction matrix to an input image to provide ~~optimize~~ color correction and white balance for each of said plurality of known reference colors to obtain a color-corrected and white-balanced image from ~~an~~ said input image.

2. (canceled)

3. (previously presented) A method as in claim 15 wherein said color correction method comprises obtaining, for each of the plurality of known reference colors,

$$(Gn' \text{ [what expect to see]} - G_c \text{ [actual]})^2 \cdot W_i = G_E$$

$$(Rn' - R_c)^2 \cdot W_i = R_E$$

$$(Bn' - B_c)^2 \cdot W_i = B_E$$

where Gn', Rn' and Bn' are expected color values, G_c, R_c and B_c are actual color values, and W_i is a weighting factor for each of colors i, i varying from 1-j colors, and minimizing G_E, R_E, and B_E for each of the plurality of colors.

4. (previously presented) A method as in claim 1 wherein there are at least seven reference colors.

5. (previously presented) A method as in claim 1 wherein there are twenty-four reference colors.

6. (currently amended) An image sensor apparatus, comprising:

an image sensor device, operating using a color filter array which provides color filtering such that colors transmitted to each pixel are measured to determine all color components that actually impinge on an area of said pixel; and

an image processor, operating according to a single color correction matrix adjusted to minimize respective error measures, each said error measure representing a difference between a reference output for a known reference color from a color image array and what would be expected for said reference output, said color correction matrix being adjusted according to at least the color white, three primary colors, ~~gray scale elements,~~ and at least two additional non-primary colors.

7. (currently amended) An apparatus as in claim 6 wherein said color correction matrix is adjusted according to at least three primary colors, ~~gray scale elements,~~ the color white, and at least three colors other than said three primary colors~~, gray scale elements,~~ and white.

8. (previously presented) An apparatus as in claim 6 wherein said color correction matrix is adjusted based on a total of twenty-four colors.

9. (previously presented) An apparatus as in claim 6 wherein said color correction matrix operates according to

$$(Gn' \text{ [what expect to see]} - G_c \text{ [actual]})^2 \cdot W_i = G_E$$

$$(Rn' - R_c)^2 \cdot W_i = R_E$$

$$(Bn' - B_c)^2 \cdot W_i = B_E$$

where Gn', Rn' and Bn' are expected color values, G_c, R_c and B_c are actual color values, and W_i is a weighting factor for each of colors i, i varying from 1-j colors, and G_E, R_E, and B_E are minimized for each of the plurality of colors.

10. (canceled)

11. (previously presented) An apparatus as in claim 9 wherein red, green, and blue are weighted higher than other colors.

12. (previously presented) An apparatus as in claim 6 wherein said color correction matrix is adjusted according to all colors of a chromaticity chart.

13. (currently amended) A method of correcting an image from an image sensor, comprising:

dividing the image sensor into a plurality of pixels;

placing color separators over said plurality of pixels, such that each pixel receives incoming light that is filtered to emphasize one color component; and

obtaining a color correction matrix for said pixels, said color correction matrix being one which takes into account correction of incoming radiation for at least the color white, three primary colors, ~~gray scale elements,~~ and two other non-primary colors, wherein respective error measures for said ~~gray scale elements and~~ non-primary colors are weighted such that said correction matrix corrects for some of said ~~gray scale elements and~~ non-primary colors more than said primary colors, each error measure representing a difference between a reference output for a known reference color from a color image array and what would be expected for each of said reference outputs; and

applying said color correction matrix to obtain a subjectively color-corrected and white-balanced image directly from an input image.

14. (canceled)

15. (previously presented) A method as in claim 1, further comprising the step of applying a weight factor to each said error measure for each of said plurality of known reference colors to obtain a respective weighted error measure for each of said plurality of known reference colors.

16. (currently amended) A method as in claim 15, wherein higher weight factors are applied to colors including at least one of red, green, blue, human skin elements, and gray scale elements than to other colors.

17. (previously presented) An apparatus as in claim 9, wherein simultaneous equations are used to minimize G_E, R_E, and B_E for each of the plurality of colors.

18. (previously presented) An apparatus as in claim 6, wherein said color correction matrix has an error measure for some colors weighted more than an error measure for other colors.

19. (new) A method as in claim 1, wherein white-balance occurs dynamically in real time such that ratios of color channels of the imager at white areas of the image equal ratios of the same color channels measured for white image areas in the same illumination conditions as existed when obtaining said color correction matrix.

20. (new) A method as in claim 13, wherein white-balance occurs dynamically in real time such that ratios of color channels of the imager at white areas

of the image equal ratios of the same color channels measured for white image areas in the same illumination conditions as existed when obtaining said color correction matrix.

21. (new) A method as in claim 15, wherein said weight factor is assigned to a respective color based on impact on subjective image quality.

22. (new) An apparatus as in claim 9, wherein said weighting factors W_i are assigned to a respective color based on impact on subjective image quality.